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ABSTRACT

Due to the importance of visual stimuli for learning, the videodisc is expected to have a major impact on education. When combined with the computer, it will greatly expand the capabilities of computer assisted instruction. There are two major types of videodisc equipment: the optical type with a laser beam to read the information from the disc, and the capitance version which reads the information by means of a stylus riding in the grooves of the disc. Both types should shortly be available to educators at a reasonable cost. (STS)

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INTELLIGENT VIDEO DISC AS A MAJOR COMPONENT OF INDIVIDUALIZED INSTRUCTION

by

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This presentation will begin from the premise that a visual base for learning is necessary to approach the learning capacity of individuals. Research into the field of visual literacy has given many examples of the importance of the visual to learning. This is often overlooked in the post-Gutenburg age we are presently operating under.

Some of the first stimulus received by people comes from the visual sense. Babies quickly learn that when the bottle is

being heated upon the stove, they will soon be having the milk they desire. Soon they point, cry and smile to bring that bottle to them. Very early in life babies learn to distinguish faces. They know what type of responses they can generally expect from different people and what sort of needs will be gratified. Why else will babies stop crying when they see father and start crying when they see the nurse?

Shortly after this initial period of visual learning comes the television era. TV is much welcomed by parents. Children are more quiet while watching TV, allowing parents to sleep in longer or prepare the evening meal.

With the advent of TV programs designed specifically to enhance learning, there has been a tremendous change in the learning progress of elementary age school children. Curriculums in kindergarten and first grade have to be modified in order to stay up with the children. Actually, these curriculums have to be molded into one and a new first-grade curriculum has to be devised. From that point on, information presented in all grades must be advanced.

This seems incongruous with the fact that standard reading and performance tests are showing declines by students entering college. However, the Stanford-Binet tests, which are geared to average out to an IQ of 100 for the total population, now show pre-school children to be averaging about 105 to 107 IQ. Soon after these children begin school, the IQ drops back down to about 103. Only at the age of about 18 does the IQ go near the previous level of 105.

This is a very recent occurrence. As a matter of fact, the intelligence measure for children 3 months to 5 years of age has increased 28% in 1977 over the measurement used in 1972. Studies have been done which chart this apparent rise in basic intelligence to parallel it with the rise of television in the home. It is found that there is a direct correlation between the percentage of homes owning television sets and this rise in IQ scores. Therefore, the visual enrichment of television, even before Sesame Street, allowed children to gain a strong base of knowledge to help them in future learning. It is only when they get back into school, when they are deprived of much of this stimulation, that there is any retrogression.

Recent studies by Dr. Bogen and others in the field of left- and right-brain lateralization have given further credence to the proposition that visual learning is essential to help people learn at all ages. Bogen has shown through surgery and testing that the two halves of the brain, or hemispheres, have different functions. The left hemisphere is concerned with linear-based learning. This applies directly to reading. Students learn first what the letters of the alphabet are, how the letters are strung together into words and how the words are strung together into concepts. However, the right hemisphere of the brain is concerned with conceptual thinking. Instead of looking at an idea from a linear point of view, the entire idea is digested and action is taken upon it all at once. This is often called intuitive learning, where a student has been presented many ideas on one subject and then suddenly everything that has been total confusion to him previously

makes sense. This hemisphere of the brain is very much concerned with visual learning.

With two different hemispheres, one linear, or reading oriented, and the other conceptual, or visual oriented, there must be two ways of approaching every learning activity. Television approaches the right hemisphere, whereas school approaches the left hemisphere. Were the learning situation to use both hemispheres simultaneously, the learning potential of all students could be greatly enhanced.

Now that we have determined that there is a visual base for learning, we should seek out new ways of improving the utilization of this in the learning environment. One of the most promising areas to come up recently is that of the video disc. To understand the disc, you must first understand its physical properties. The video disc itself looks very much like the photograph record that you have in your long-playing stereo albums at home. It is a 12-inch disc, made of vinyl material, that is played on a disc player. The player itself looks much like a video tape recorder that is shrunk to one-half the size of 3/4-inch U-Matic video recorder.

There are two major types of video disc. One is optical, which operates with a laser beam to read the information on the disc. The other is the capitance version, which reads the information through the use of a stylus riding in the grooves of the disc.

The optical disc will be manufactured by several companies. Principally among them will be the consortium of Phillips/MCA in this country. The disc itself is plastic, coated with aluminum and a transparent protective layer. It is either 12 inches or

8 inches wide and will sell for a price somewhat above what a record album costs. There are two types of discs. One will play for 30 minutes on one side only. The other is a two-sided disc that will play for 60 minutes per side. The machine itself will cost approximately $500. The advantages of the optical disc are that the picture can be speeded up or slowed down. Each of the 54,000 frames in a 30-minute disc can be individually referenced for search and playback and shown as still images. Fingerprints or dust will not distort the picture. The disc can be made thick, or thin enough to be sent through the mail. The disc's life is virtually unlimited and the machine's optical pickup element will survive over 10,000 hours of use.

The capitance system is being developed by RCA. The disc itself is made up of vinyl copolymer coated with metal, dielectrc and lubricant. It is 12 inches wide and will sell for approximately $10 per 2-hour disc. The machine itself will cost approximately $500. The capitance disc will last in excess of 500 plays and the stylus must be replaced after about 500 hours.

The RCA capitance system offers advantages in manufacturing ease, which may make it possible for many of these machines to be available within a short amount of time after introduction. However, that is its only advantage to the consumer. The MCA/Phillips optical disc offers the extremely important function of searching for and individually playing each of the 54,000 frames on its 30-minute-play disc.

By attaching a small computer to the disc playback, costing about $2,000, computer-assisted instruction is possible. Using

the first few hundred frames in a disc, all information needed to program the computer can be provided. The next 53,000 plus frames can be individual units of information. This information can be selected automatically by the computer or on manual override by the operator. Students can be presented information in a completely visual manner. The disc can then ask the student to respond to questions. According to how the student responds, the disc will select the next information. For example, if a student answers the questions correctly, the program can switch him to the next level of material to study. If he answers incorrectly, it can switch him to a review or to new material that would give him background according to the type of skill he was thought to be missing. The flexibility of this system is primarily limited only by the capability of the programmer to anticipate student needs.

In the past, to produce computer-assisted instruction you had to rely on expensive systems, often requiring a central computer and offering very little visual display. The advantage of the video disc with microprocessor is that for approximately $2800 for a monitor, disc player and microprocessor, the instructor is offered a virtually unlimited capacity computer. Each video disc provides the memory needed for that particular program.

The discs themselves are exceedingly inexpensive, as reproduction costs are approximately $1300 for the first program and 60¢ for every program thereafter. Therefore, the per program costs go down in proportion to the number of copies reproduced. Each student can carry his own program rather than have it stored in a central computer.

There has been much talk about the availability of the video

disc. It has been offered for sale "approximately next year" for the past few years now. There are some reasons to expect that 1978 will be the introduction year of the video disc in this country, and that 1979 will begin the full exploitation of this medium. MCA has just established a video disc reproduction manufacturing facility. They have also contracted with Pioneer Electronics of Japan to begin video disc sales in Japan this year.

Generally speaking, we can see how the video disc will fit into the current level of poliferation of television within this society. Television made its first big mark in 1954 with only five thousand sets in people's homes. By 1964 that had risen markedly to one and one-half million sets. There were five and one-half million sets by 1969. Americans' leisure-time money in 1976 was one hundred fifty million dollars, enough so that ten percent of color television owners in this country have indicated that they would buy a video disc machine in the first year of its introduction. There is already a wealth of material available for distribution. MCA has in its vaults 11,000 film titles and all other major motion picture producers are interested in translating their programs to video disc. Added to this will be "how to" programs, such as Arnold Palmer explaining the back stroke and Julia Childs explaining leg of lamb. New programs are already being manufactured in Great Britain for the video disc market.

Many other video applications are being devised in American education. One very recent example of this is the use of video satellites. There has been much explorative work done with video satellites to check their potential for learning. Most of the experiments have been exceedingly positive. There is also an

increased reliance upon computer-assisted instruction in the learning environment.

By introducing low-cost technology with the combined versatility of video and CAI, the education marketplace should change dramatically within the first decade of video disc introduction. Computer-assisted instruction is primarily linear, or left-brain oriented. Video is primarily visual, or right-brain oriented. Therefore, we will have the capability of video combined with the computer. This combination may provide for its own very unique learning situations which could be greater than video or computers on their own.

Two things will slow down the introduction of video disc into education. One, that schools and colleges would unwittingly buy capitance or two-hour optical disc playback devices, not knowing that these will be incompatable with computer-assisted instruction. Secondly, schools and colleges will not know enough about the potential of the video disc in learning to plan for its immediate inclusion into the learning environment. Barring this, 1979 should be an extremely exciting year for increased learning potential of America's students.

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